BLM LIBRARY
88047975

...artment of the Interior
... Land Management

Alaska State Office
222 West 7th, #13
Anchorage, Alaska 99513

Movements and Distribution of Radio-Collared Caribou in the Buckland Valley and Nulato Hills, Winter of 1989-90

Scott R. Robinson and Mary Leykom

JK
870
.L3
O6
no.33

BLM-Alaska Open File Report 33
March 1991

BLM LIBRARY
RS 150A BLDG. 50, OC-521
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Authors

Scott R. Robinson, Bureau of Land Management, 1150 University Avenue, Fairbanks, AK 99709.

Mary Leykom, Bureau of Land Management, P.O. Box 1049, Kotzebue, AK 99752.

Open File Reports

Open File Reports identify the results of inventories or other investigations that are made available to the public outside the formal BLM-Alaska technical publication series. These reports can include preliminary or incomplete data and are not published and distributed in quantity. The reports are available at BLM offices in Alaska, the USDI Resources Library in Anchorage, various libraries of the University of Alaska, and other selected locations.

Copies are also available for inspection at the USDI Natural Resources Library in Washington, D.C., and at the BLM Service Center Library in Denver.

#24166693

D88047975

JK
97
.I3
06
no.33

Movements and Distribution of Radio-Collared Caribou in the Buckland Valley and Nulato Hills, Winter of 1989-90

Scott R. Robinson and Mary Leykom

BLM LIBRARY
RS 150A BLDG. 50, 0C-521
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Bureau of Land Management
Alaska State Office
Anchorage, Alaska 99513

Open File Report 33
March 1991

Table of Contents

Page

Introduction 1
Study Area 1
Methods 4
Results 4
  Caribou 4
  Reindeer 8
Discussion 8
Recommendations 9
Literature Cited 10
BLM-Alaska Open File Report Series 11

List of Figures

Figure 1 2
Figure 2 3
Figure 3 5
Figure 4 6
Figure 5 7

List of Tables

Table 1 4

INTRODUCTION

With a minimum count of 343,000 caribou (*Rangifer tarandus granti*) in 1988, the Western Arctic Herd is the largest in Alaska and ranges over the northwest quarter of the state. This herd has continued to increase in size since 1976, when the population was estimated at 75,000 animals (Larsen et al. 1990). Parallel expansion into previously unoccupied winter range has also occurred since 1976. Presently, the Western Arctic Herd is an important subsistence resource to residents of approximately 30 rural villages. Moreover, people from throughout Alaska and elsewhere travel to northwest Alaska to view, photograph, and hunt caribou.

In 1975, NANA Reindeer Enterprises filed an amended application to graze reindeer (*R. t. tarandus*) in the northeast corner of the Seward Peninsula. The Bureau of Land Management (BLM) issued a grazing permit to NANA for a maximum of 5,000 reindeer (BLM 1976). Nathan Hadley of Buckland and Doug Sheldon of Candle have held grazing permits in this area since 1987. The Henry family of Koyuk has grazed reindeer in the Koyuk drainage since 1962; Merlin Henry has herded 800 reindeer since 1981. BLM (1986) prepared an Allotment Management Plan (AMP) for his herd. The Sagoonick family of Shaktoolik has grazed reindeer along Norton Sound since 1968; the present herd has an estimated 1,400 reindeer. BLM (1990) also prepared an AMP for the Sagoonick herd. All four reindeer allotments fall within winter range of western arctic caribou.

Caribou and reindeer using the same rangeland have never been compatible (Shideler et al. 1986). When ranges of these two populations (wild and domestic) overlap, resident reindeer link with transient caribou and leave their grazing allotments. Adams (1983) prepared a Habitat Management Plan (HMP) because of this dual use conflict between caribou and reindeer in the Buckland Valley. This study included the Nulato Hills because western arctic caribou expanded their winter range southward into other reindeer allotments in recent years. This report partially implements the Buckland Valley HMP. Results from previous caribou surveys for this area were reported by Adams and Connery (1983), Smith (1984, 1985), Smith and Machida (1986), Robinson and Field (1987), Robinson (1988), and Robinson and Spindler (1989). The Alaska Department of Fish and Game (ADFG) and U.S. Fish and Wildlife Service (FWS) were cooperating agencies in this study. Each agency funded their respective share of the work.

Objectives of this project were: (1) to document seasonal migration patterns and winter range of western arctic caribou in the Buckland Valley and Nulato Hills, (2) to monitor the caribou with respect to adjacent reindeer herding activities, and (3) to make information concerning caribou distribution and movements available to the public in a timely manner.

STUDY AREA

Encompassing 6.3 million acres, the Buckland Valley and Nulato Hills comprise one of the largest blocks of BLM-managed land in Alaska. This area is bounded on the north by the Selawik Hills, on the east by the Koyukuk and Yukon rivers, on the south by the Unalakleet River, and on the west by Norton Sound and the Seward Peninsula (Fig. 1). Four domestic reindeer grazing allotments overlap the study area (Fig. 2). The Buckland Valley is broad, whereas the Nulato Hills have rounded summits with gentle slopes dropping into narrow valleys. Elevation ranges from sea level to 3,411 feet atop Debauch Mountain in the Nulato Hills.

Regional climate is characterized by severe winters from October to April and cool, wet, windy summers. Normal winter temperatures range from -20 F to +10 F with extreme lows of -50 F to -60 F. Annual precipitation averages less than 15 inches, including less than 50 inches of snow. Snow depths on the ground vary because of drifting. The average wind speed is 11 knots year-round. Weather patterns can prevent aircraft from flying for several consecutive days (Selkregg 1977).

The areas lowest in elevation are characterized by graminoid vegetation, whereas higher, well-drained slopes are covered by low shrub scrub. The hills and mountains are covered by black spruce (*Picea mariana*) at lower elevations with graminoid and low shrub scrub above tree line. Tall willows (*Salix* spp.) and white spruce (*Picea glauca*) line the riparian zone, and several species of lichens grow throughout the study area.

Key wildlife species in this area are caribou, moose (*Alces alces*), grizzly bear (*Ursus arctos*), and wolf (*Canus lupus*). A variety of furbearers, waterfowl, small game, and nongame species are also present. A detailed description of the

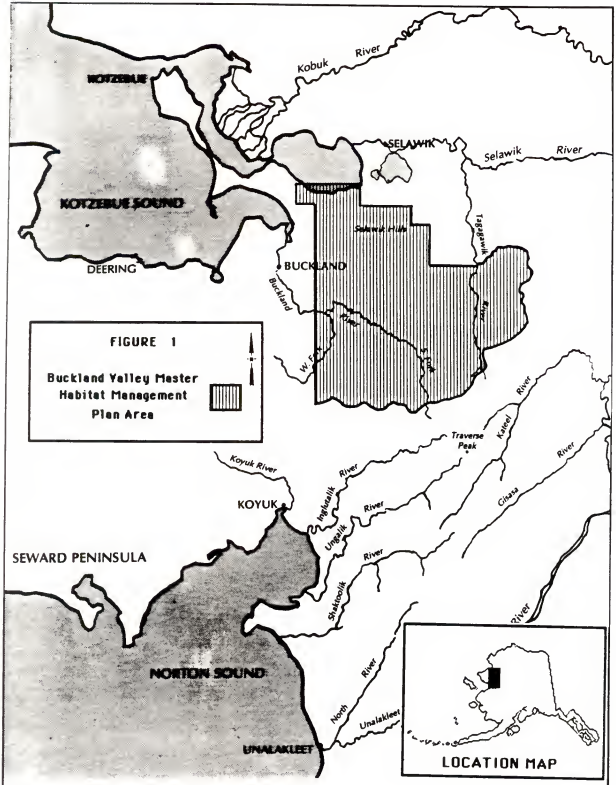

KOTZEBUE
Kobuk River
SELAWIK
Selawik River
KOTZEBUE SOUND
Selawik Hills
Tagagawik River
DEERING
BUCKLAND
Buckland River
Kiana
FIGURE 1
Buckland Valley Master Habitat Management Plan Area
Traverse Peak
Kuyuk River
Kuyuk River
KOYUK
Inglutalik River
Unguli River
Gisasa River
SEWARD PENINSULA
Shaktoolik River
NORTON SOUND
North Unalakleet River
UNALAKLEET
LOCATION MAP

Figure 1

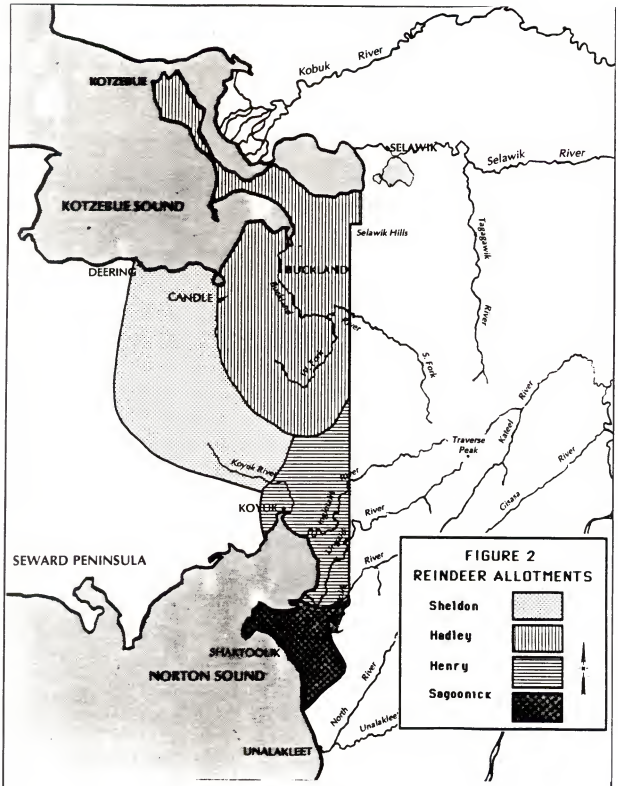

KOTZEBUE
Kobuk River
SELAWIK
Selawik River
KOTZEBUE SOUND
Selawik Hills
DEERING
BUCKLAND
CANDLE
Buckland River
Hunt River
Tagagawik River
S. Fork
Kiwalik River
Traverse Peak
Kiwalik River
Kiwalik River
KOYUK
Koyuk River
Criss River
SEWARD PENINSULA
FIGURE 2
REINDEER ALLOTMENTS
Sheldon
Hadley
Henry
Sagoonick
SHAKTOOLIK
NORTON SOUND
North River
Unalakleet River
UNALAKLEET

Figure 2

study area can be found in the *Buckland Valley Habitat Management Plan*, the *Northwest Unit Resource Analysis*, and the *Central Yukon Resource Management Plan* (Adams 1983, BLM 1982, 1986).

METHODS

Between September 4 and 11, 1989, ADFG personnel captured and fitted 32 caribou with radio-collars as they crossed the Kobuk River at Onion Portage. This collaring effort brought the total number of caribou fitted with functioning collars to approximately 112 animals. Thirteen radio-tracking flights over part or all of the Buckland Valley and Nulato Hills were conducted from October 4, 1989 to March 26, 1990 (Table 1). Flights were flown as high as 10,000 feet with either a Cessna 185 or 206 traveling at cruising speed. Locations of individual animals were recorded, mapped, and later transferred to a dBase III Plus file for storage on a personal computer at the ADFG office in Kotzebue. Locations of reindeer were also noted whenever possible. Locations were described by general areas within river drainages and, whenever possible, by township and range of the public land rectangular system of survey (BLM 1979).

Shaded areas on Figures 3-5 correspond to two different time periods depicting one or more caribou surveys. The outside border encompasses all caribou located during the indicated flight. All of the reported mileage figures are considered as a minimum distance traveled. Since the caribou were not monitored daily, these figures represent only a measurement of distance between two location points.

RESULTS

Caribou

Three surveys were flown between October 4 and 11, locating 59 caribou; some animals were located more than once. After crossing the Kobuk River, the majority of caribou moved south and west through the Selawik River valley to the Buckland River valley, where a large aggregation occurred. Sixty-eight caribou were located during three surveys flown October 20, 26 and November 6. During this period, the animals moved near the southern extent of their winter migration. Three caribou were located east of Shaktoolik Village and one on the North Fork of the Unalakleet River (Fig. 3).

The November 28-29 survey located only 11 animals because of incorrect programming of the radiotelemetry receiver, but observations did show a continued southward migration. The

Table 1. Aerial surveys of radio-collared caribou across Buckland Valley and Nulato Hills, Winter of 1989-90.

Flight number	Survey date	Total number relocations	Agency	Observers
1	10/04/89	11	FWS	Spindler, Shaw
2	10/9-11/89	24	ADFG	Larsen, Dau
3	10/10/89	24	BLM	Robinson, Leykom
4	10/20/89	9	ADFG	Larsen, Dau
5	10/26/89	15	ADFG	Dau
6	10/26/89	15	ADFG	Smith, Nelson
7	11/06/89	29	BLM/FWS	Leykom, Karmun
8	11/28,29/89	11	BLM/ADFG	Leykom, Dau
9	12/20/89	30	ADFG	Dau, Hadley
10	1/18/90	43	ADFG	Coady, Machida
11	1/28/90	30	BLM/FWS	Leykom, Karmun
12	2/19/90	31	BLM	Leykom
13	3/26/90	37	BLM	Robinson, Field

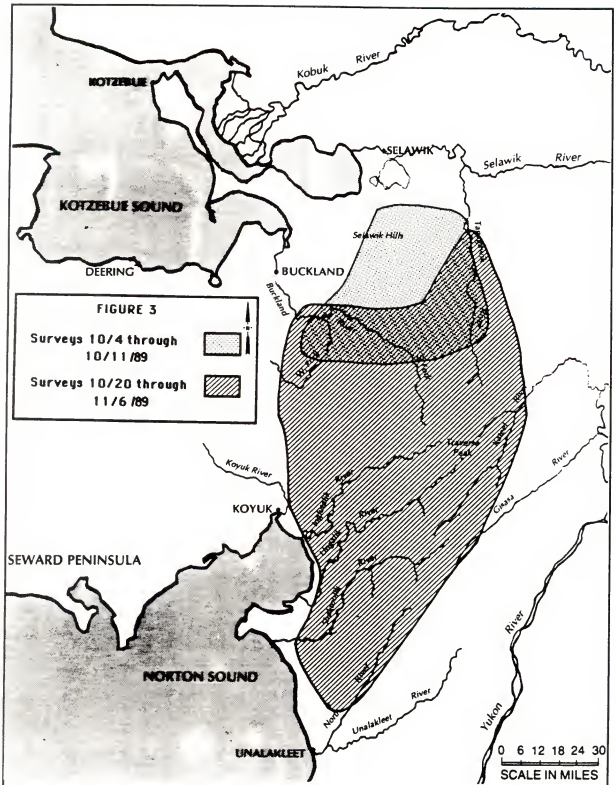

KOTZEBUE
Kobuk River
SELAWIK
Selawik River
KOTZEBUE SOUND
Selawik Hills
DEERING
BUCKLAND
Buckland
FIGURE 3
Surveys 10/4 through 10/11/89
Surveys 10/20 through 11/6/89
Kuyuk River
KOYUK
SEWARD PENINSULA
NORTON SOUND
UNALAKLEET
Unalakleet River
Yukon River
0 6 12 18 24 30
SCALE IN MILES

Figure 3

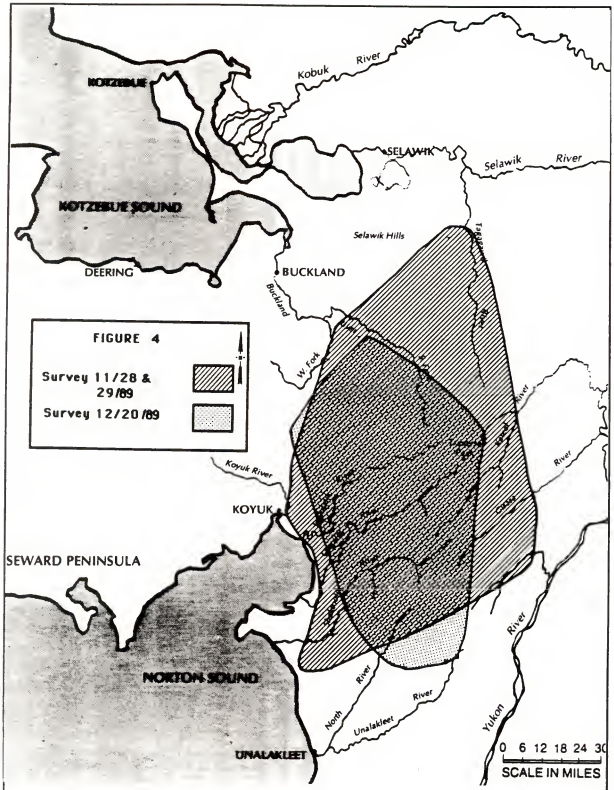

KOTZEBUE
Kobuk River
SELAWIK
Selawik River
KOTZEBUE SOUND
Selawik Hills
DEERING
BUCKLAND
Buckland
FIGURE 4
Survey 11/28 & 29/89
Survey 12/20/89
W. Fork
Koyuk River
KOYUK
SEWARD PENINSULA
NORTON SOUND
North River
Unalakleet River
Yukon River
UNALAKLEET
0 6 12 18 24 30
SCALE IN MILES

Figure 4

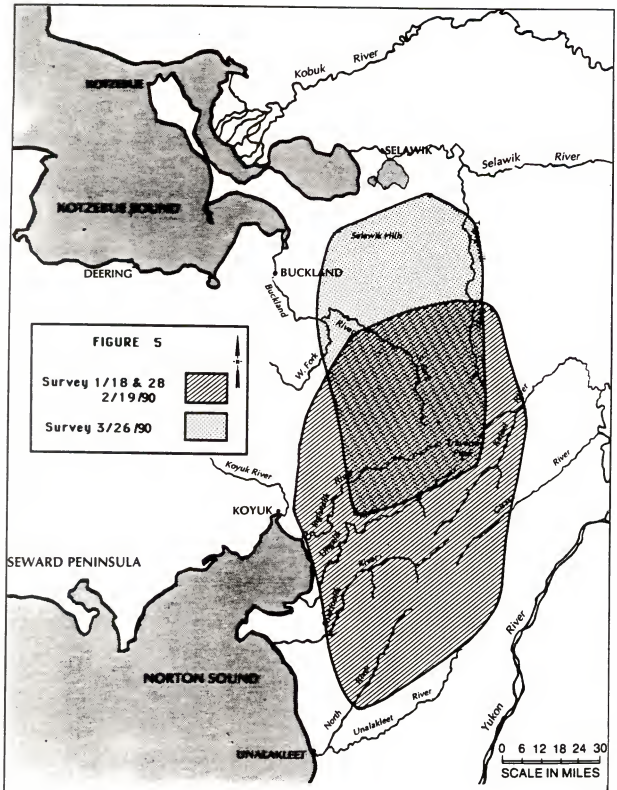


FIGURE 5
Survey 1/18 & 28 2/19/90
Survey 3/26/90
KOTZEBUE
Kobuk River
SELAWIK
Selawik River
KOTZEBUE SOUND
Selawik Hills
DEERING
BUCKLAND
Buckland River
W. Fork
Koyuk River
KOYUK
SEWARD PENINSULA
NORTON SOUND
Unalakleet River
UNALAKLEET
Yukon River
0 6 12 18 24 30
SCALE IN MILES

Figure 5

December 20 survey located 30 radio-collared caribou and observed more caribou continuing to move south from the Tagagawik River and Buckland Valley to the Inglutalik, Ungalik and Shaktoolik rivers (Fig. 4). Most caribou located in the November surveys were relocated in December. One animal ranged more than 60 miles north, while another was relocated just 15 miles from the previous survey.

Two surveys were conducted ten days apart during January. Distribution remained similar to that of December, with caribou once again between the Selawik Hills to the north and the Unalakleet River to the south (Fig. 5). The highest concentrations of caribou were in the South Fork Buckland, Ungalik, and Shaktoolik drainages. Most of the relocated caribou stayed within the same river drainage or area during this ten day period. Of the caribou that were located in both December and January, more than half were relocated within 15 miles of their previously recorded locations. Of the more active individuals, one caribou travelled almost 30 miles and two others traveled 50 miles or more: one north-northeast and the other south.

The February survey showed caribou dispersed throughout the same area as in January (Fig. 5). Some congregating was noted in the South Fork Buckland and upper Ungalik drainages and the Traverse Peak area. Of the 18 radio-collared caribou located in both January and February surveys, 14 were relocated within 20 miles of their earlier locations. Once again, a few animals had traveled 40-45 miles during that three week period.

The late March survey showed a distinct northward movement of Western Arctic Herd members (Fig. 5). Of the 37 radio-collared caribou which were located, only two were south of Traverse Peak. Twenty-two of the caribou were in the Buckland Valley, the Selawik Hills, and lower Tagagawik drainage. Almost all individuals located in February and again in March had moved north. One radio-collared caribou was relocated in the Buckland Valley approximately 115 miles from where it was located in the Unalakleet drainage in February.

Reindeer

Mr. Henry's reindeer occupied an area approximately eight miles north of Koyuk Village and east of the Koyuk River from September 1989 until April 1990. He estimated a loss of at least 100 reindeer to caribou that occupied his permit area throughout the winter. He estimated 4,000-5,000 caribou resided along the East Fork of the Koyuk River. Because of the heavy concentrations of caribou, Mr. Henry was unable to move his reindeer into the southeastern portion of his permit area as was planned for the winter of 1989-90 (Merlin Henry, per. commun.).

From November 1989 to April 1990, Mr. Sagoonick did not report any serious conflicts with caribou moving into the area where his reindeer grazed, which was west of Diamond Creek approximately 18 miles northwest of Shaktoolik. However, he did report a major concentration of caribou moving into the area immediately south of Shaktoolik, but they were quickly driven from the area because of intense hunting pressure from the local villagers (Palmer Sagoonick, per. commun.).

DISCUSSION

The Buckland Valley has been an important winter range of Western Arctic Herd caribou since the 1950s (Adams 1983). Tens of thousands of caribou have occupied it in recent winters. Caribou began passing through Buckland Valley into the Nulato Hills and Seward Peninsula during the early 1980s (Smith 1984). Smith (1985) reported caribou as far south as the Koyuk, Shaktoolik and Kateel rivers during the winter of 1984-85. Smith and Machida (1986) reported substantial numbers of caribou migrated southward to the upper Anvik River and several thousand caribou migrated westward to the Kiwalik and Koyuk drainages during the winter of 1985-86. Robinson and Field (1987) reported caribou migrating along the Tagagawik River to spend most of the winter of 1986-87 in the Nulato Hills. Many tens of thousands of caribou occupied the Buckland Valley and Nulato Hills during the winters of 1987-88, 1988-89, and 1989-90 (Robinson 1988, Robinson and Spindler 1989, present report). This range expansion parallels a population growth of the herd from 75,000 animals in 1976 to 343,000 in 1988.

The Buckland Valley has been used for reindeer grazing since the 1930s (Adams and Robus 1981). Where ranges of caribou and reindeer overlap, resident reindeer link with transient caribou. NANA Regional Corporation lost several thou-

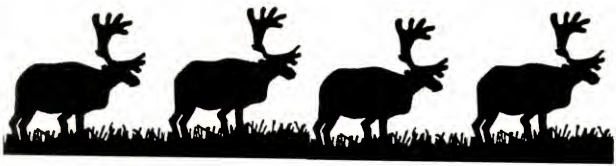
sand reindeer during the 1982-83 and 1983-84 winters, but none were reported lost during 1984-85 (Smith 1984,1985). During fiscal year 1986, NANA lost approximately $375,000 in the value of its herd because of reindeer migrating away with caribou. Consequently, NANA sold their herd in fiscal year 1987 (NANA 1986, 1988). This year, caribou moved within close range of Mr. Henry's reindeer for the fifth consecutive year. Some reindeer were lost during 1985-86 (Smith and Machida 1986), none during 1986-87 and 1987-88, at least 100 animals during 1988-89 (Robinson and Spindler 1989), and at least 100 animals during 1989-90. Economic hardship to reindeer herders can occur when their animals leave with migrating caribou.

RECOMMENDATIONS

This study demonstrates the importance of the Buckland Valley and Nulato Hills as wintering habitat for Western Arctic Herd caribou. Patterns of distribution in 1989-90 showed similar usage to that of the two previous years. Therefore, we recommend that BLM continue to enforce its decision to reduce the size of the reindeer allotment in Buckland Valley and permit reindeer grazing within the eastern half of the Hadley Allotment under an approved AMP only after five consecutive years of non-use by caribou (BLM 1982). ADFG (1984) recommends against issuing additional reindeer permits on ranges currently occupied by caribou or with a high probability of being occupied by caribou in the future.

We also recommend continued monitoring of western arctic caribou within the study area as directed by Objective 1.c. of the Buckland Valley HMP (Adams 1983). For the herders' benefit, visual sitings of caribou would be nice to have, but would cost additional flight hours. When possible, we will invite a member of the Reindeer Herders Association to fly with us. After each flight, we shall contact the Reindeer Herders Association with information regarding caribou locations. They, in turn, will contact the affected herder.

Acknowledgments. We thank J. Dau (ADFG-Kotzebue) for assisting with tracking and background information. V. Karmun and R. Brubaker (FWS-Kotzebue) assisted with tracking information and acted as observers. Pilots J. Rood of Northwestern Aviation and T. Harold of Bering Air flew safe missions under limited weather conditions. J. Hunter of the National Weather Service office in Kotzebue provided weather information. L. Field (BLM-Fairbanks) prepared the reindeer information. C. Bowne, student in an editing class at the University of Alaska Fairbanks, and H. Brownell provided valuable editorial comments for this manuscript.



LITERATURE CITED

Adams, L.G. 1983. Buckland Valley master habitat management plan. USDI, Bur. Land Manage., Fairbanks, Alaska. 59pp.

Adams, L.G. and B.A. Connery. 1983. Buckland River reindeer/caribou conflict study final report. USDI, Bur. Land Manage., BLM-Alaska Open File Rep. 8, Anchorage, Alaska. 170pp.

Adams, L.G. and M.H. Robus. 1981. Caribou and domestic reindeer on public lands in Alaska: Introduction to a unique management problem. Trans. 46th N. Am. Wildl. and Nat. Resour. Conf. Washington, D.C. pp319-328.

Alaska Department of Fish and Game. 1984. Western arctic caribou herd, strategic management plan. Alaska Dep. Fish and Game, Nome, Alaska. 15pp.

Bureau of Land Management. 1976. Environmental analysis record, NANA reindeer grazing application in the Kotzebue-Noatak area. USDI, Bur. Land Manage., Fairbanks, Alaska. 111pp.

Bureau of Land Management. 1979. Specifications for descriptions of tracts of land for use in land orders and proclamations. USDI, Bur. Land Manage., Washington, D.C. 26pp.

Bureau of Land Management. 1982. Northwest unit resource analysis. USDI, Bur. Land Manage., Fairbanks, Alaska. 355pp.

Bureau of Land Management. 1986. Proposed resource management plan and final environmental impact statement for the central Yukon planning area. USDI, Bur. Land Manage., BLM-AK-PT-86-010-1610-026, Fairbanks, Alaska. 425pp.

Bureau of Land Management. 1986. Allotment management plan for the Merlin Henry permit area. USDI, Bur. Land Manage., Fairbanks, Alaska. 17pp.

Bureau of Land Management. 1990. Grazing management plan for the Shaktoolik allotment. USDI, Bur. Land Manage., Fairbanks, Alaska. 13pp.

Larsen, D.N., J. Dau, and S. Machida. 1990. GMU 21D, 22A, 22B, 23, 24, and 26 caribou report. Pages 135-157 in S.O. Morgan, ed. Annual Report of Survey-Inventory Activities, Vol. XX, Part XI. Alaska Dep. Fish and Game, Fed. Aid Wildl. Rest., Proj. W-23-2, Study 3.0. Juneau, Alaska. 183pp.

NANA. 1986. 1986 annual report. NANA Regional Corp. Kotzebue, Alaska. 33pp.

NANA. 1988. 1988 annual report. NANA Regional Corp. Kotzebue, Alaska. 32pp.

Robinson, S.R. and L.W. Field. 1987. Movements and distribution of western arctic caribou herd across Buckland Valley and Nulato Hills. USDI, Bur. Land Manage., BLM-Alaska Open File Rep. 21, Anchorage, Alaska. 7pp.

Robinson, S.R. 1988. Movements and distribution of western arctic caribou herd across Buckland Valley and Nulato Hills. USDI, Bur. Land Manage., BLM-Alaska Open File Rep. 23, Anchorage, Alaska. 11pp.

Robinson, S.R. and M.A. Spindler. 1989. Movements and distribution of radio-collared caribou across Selawik Valley, Buckland Valley, and Nulato Hills, winter of 1988-89. USDI, Bur. Land Manage., BLM-Alaska Open File Rep. 26, Anchorage, Alaska. 25pp.

Shideler, R.T., M.H. Robus, J.F. Winters, and M. Kuwada. 1986. Impacts of human developments and land use on caribou: A literature review, Volume I: A worldwide perspective. Alaska Dep. Fish and Game, Tech. Rep. No. 86-2, Juneau, Alaska. 219pp.

Selkregg, L.L. 1977. Alaska regional profiles, northwest region. University of Alaska, Arctic Environmental Information and Data Center. Anchorage, Alaska. 265pp.

Smith, T. 1984. Movements of western arctic herd caribou onto the Seward Peninsula and their relation to domestic reindeer herds, winters of 1982-83 and 1983-84. Alaska Dep. Fish and Game, Nome, Alaska. 25pp.

Smith, T. 1985. Movements of western arctic herd caribou onto the Seward Peninsula and their relation to domestic reindeer herds, winter of 84-85. Alaska Dep. Fish and Game, Nome, Alaska. 14pp.

Smith, T. and S. Machida. 1986. Movements of western arctic herd caribou onto the Seward Peninsula and their relation to domestic reindeer herds, winter of 1985-86. Alaska Dep. Fish and Game, Nome, Alaska. 9pp.

BLM-Alaska Open File Report Series

1. Upper Colville River channel depth survey. Jack Mellor, June 1983. 16pp.
2. Archaeological investigations of the Delong Mountains, northwest Alaska. Howard Smith, June 1983. 26pp.
3. Archaeological reconnaissance in the Central Arctic Management Area. Howard Smith, June 1983. 19pp.
4. Results of the 1981 bald eagle nest survey. Laurence Byrne, David Daum, Michael Small and Julie Henderson, June 1983. 20pp.
5. Results of the 1982 bald eagle nest survey. Laurence Byrne, Julie Henderson and Michael Small, June 1983. 12pp.
6. Results of the 1982 trumpeter swan survey. Laurence Byrne, Julie Henderson, Michael Small. June 1983. 7pp.
7. The 1982 peregrine falcon/raptor survey in the Central Arctic. Ted Swem, Robert Dittrick and James Silva, June 1983. 40pp.
8. Buckland reindeer/caribou conflict study final report. Layne Adams and Bruce Connery, June 1983. 60pp.
9. Denali Mine on Valdez Creek, southcentral Alaska. Beth Walton and Cheryl McCaffrey, November 1984. 9pp.
10. Effects of fire on a dwarf shrub-sedge tussock community. K. Van Waggoner and Marianne See, March 1985. 16pp.
11. The 1983 peregrine falcon/raptor survey. James Silva, April 1985. 23pp.
12. Status of the Ray Mountain caribou herd. Scott Robinson, June 1985. 11pp.
13. Landsat enhancement procedures and key, central Yukon area. Melanie Miller, June 1985. 10pp.
14. Fire occurrence in the Central Yukon Planning Area, 1956-1982. Melanie Miller, November 1985. 40pp.
15. Fire occurrence in the Northwest Planning Area, 1956-1982. Melanie Miller, November 1985. 37pp.
16. The 1984 fire season, Northwest Planning Area. Melanie Miller and Scott Robinson, November 1985. 21pp.
17. Wildlife of the Titna, Tozitna and Kateel watersheds. Scott Robinson, December 1985. 28pp.
18. Wildlife of the Koyuk watershed. Scott Robinson, December 1985. 14pp.
19. Beaver Creek National Wild River cultural resources inventory. Susan Will, June 1986. 48pp.
20. Wildlife of the Squirrel River, Alaska. Scott Robinson, September 1987. 20pp.
21. Movements and distribution of the western arctic caribou herd across Buckland Valley and Nulato Hills, winter 1986-87. Scott Robinson and Larry Field, September 1987. 7pp.
22. Historical fire data: BLM-Alaska 1959-1985. Russell E. Hanson, September 1987. 21pp.
23. Movement and distribution of the western arctic caribou herd across Buckland Valley and Nulato Hills, winter of 1987-1988. Scott Robinson, December 1988. 11pp.
24. Fisheries investigations in the Beaver Creek drainage, 1988. Louis Carufel, June 1989. 16pp.
25. Bird communities of recently burned and unburned forest and scrub habitats in interior Alaska. Michael T. Hinkes and Kate Engels, June 1989. 33pp.
26. Movement and distribution of radio-collared caribou across Selawik Valley, Buckland Valley and Nulato Hills, winter 1988-89. Scott Robinson and Michael Spindler, November 1989. 25pp.
27. Ecology of moose in the White Mountains National Recreation Area, Alaska, 1985-1988. Winston Hobgood and Bruce M. Durtsche, August 1990. 16pp.
28. Three years of natural revegetation on the 1977 Bear Creek burn in interior Alaska. Russell Hanson, September 1990. 42pp.
29. Distribution, movements and seasonal use areas of caribou in the White Mountains Recreational Area, Alaska. Winston Hobgood and Bruce M. Durtsche, January 1991. 9pp.
30. Dall sheep in the White Mountains. Bruce M. Durtsche, Winston Hobgood and Jan Burris, October 1990. 10pp.
31. Fisheries investigations in the Beaver Creek drainage, White Mountains National Recreation Area, Alaska, Louis Carufel, January 1991. 19pp.
32. Ground Brood Counts to Estimate Waterfowl Populations in BLM's Kobuk District, Alaska: 1990 Progress Report. Randi R. Anderson and Scott R. Robinson, February 1991. 11pp.

BLM LIBRARY
RS 150A BLDG. 50, OC-521
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Robinson, Scott R.
Movements and distribution
of radio-collared caribou

BLM LIBRARY
RS 150A BLDG. 50 / OC-521
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Bureau of Land Management

The Bureau of Land Management is responsible for the stewardship of our public lands. It is committed to manage, protect, and improve these lands in a manner to serve the needs of the American people for all times. Management is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. These resources include recreation, range, timber, minerals, watershed, fish and wildlife, wilderness, air, scenic, scientific and cultural values.

BLM-AK-91-012-6501-070